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(21) International Application Number: PCT/US00/01369 (22) International Filing Date: 20 January 2000 (20.01.00) (30) Priority Data: 60/116,636 21 January 1999 (21.01.99) US Not furnished 19 January 2000 (19.01.00) US (71)(72) Applicant and Inventor: MORRIS, Gary, J. [US/US]; 2026 Glenmark Avenue, Morgantown, WV 26505 (US). (74) Agent: VARGO, Paul, M.; Rockey, Milnamow & Katz, Ltd., Two Prudential Plaza, 47th floor, 180 North Stetson Avenue, Chicago, IL 60601 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: ENVIRONMENTAL CONDITION DETECTOR WITH REMOTE FIRE EXTINGUISHER LOCATOR SYSTEM		
(57) Abstract		
<p>A system (10) for identifying the location of a fire extinguisher (16) includes a fire detector (14) with a wireless transmitter (22). When the detector (14) goes into alarm, it not only emits a local audible alarm, it also transmits wirelessly a signal (S) receivable by a fire extinguisher locator unit. The unit includes a receiver (18) and a circuitry for detecting the received alarm indicating signal. It also includes audible output circuit (30), for example, speech synthesis circuit (30), and optionally, an optical indicator (32). Upon detection at the unit of the alarm indicating signal, the speech synthesizing circuitry (30) can be activated to indicate verbally the location of the extinguisher (16). Simultaneously, the illuminatable output device (32), such as light bulb (32) or light emitting diode (32), can be energized to provide a visual indication of extinguisher location.</p> <div style="text-align: center;"> <p>Smoke Detector transmits a wireless signal to remotely located fire extinguisher receivers when smoke is sensed.</p> <p>Wireless signal being transmitted.</p> <p>Remote fire extinguisher to be located when smoke detector activates.</p> <p>Receiver module mounted on fire extinguisher. Module may be fixed by user to the extinguisher by a band or permanently affixed from factory or located adjacent to fire extinguisher.</p> <p>"Fire Extinguisher...Fire Extinguisher..."</p> <p>When activated by a smoke detector signal, the receiver module emits an alarm tone or periodically cries out "Fire Extinguisher" so it can be easily located. Optional light turns on.</p> </div>		

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**ENVIRONMENTAL CONDITION DETECTOR WITH
REMOTE FIRE EXTINGUISHER LOCATOR SYSTEM**

The benefit of the filing date of January 21, 1999 of Provisional Application No.
5 60/116,636 is hereby claimed.

Field of the Invention

The invention pertains to fire alarm systems. More particularly, the invention pertains to apparatus and methods of locating fire extinguishers in the event of a fire.

Background for the Invention

10 During the occurrence of a fire, the occupants of the involved dwelling may need to quickly access a fire extinguisher to extinguish the fire. The occupants may not know or remember the location of an available fire extinguisher, particularly in an emotionally stressful situation with an alarming smoke or fire detector and the presence of smoke and flames.

15 A need exists for a fire safety system whereby a detector sensing smoke or fire not only sounds the conventional audible alarm, but also serves to activate an audible location identifier (a distinctive audible alarm or recorded verbal location identifier) that is fixed to a portable fire extinguisher or its mounting hardware. In this way, the location of a nearby fire extinguisher is made known to the occupant(s) of the involved
20 building.

US Patent No. 5,153,567 (Expired) describes a hardwired system whereby a fire extinguisher housing contains a smoke alarm and flashing light. Other related prior art known to the inventor is the US Patent Number 5,587,705 solely owned by the present inventor, and which describes radio frequency links between environmental
25 condition detectors and remote, emergency lighting systems. US Patent Number 5,793,280 describes a beacon that is located on a fire extinguisher bracket such that the beacon is activated by the presence of motion in close proximity to the bracket.

Summary of the Invention

30 The invention described herein is a fire safety system whereby the occupants of a building are immediately notified of the location of fire extinguishers in close proximity. An audible alarm or verbal location identifier is activated by a remotely

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located, displaced, environmental condition detector (smoke detector, fire detector or heat detector).

In one embodiment, a fire detector is wirelessly coupled to a local extinguisher. When the detector senses an environmental condition such as smoke, fire, or heat it
5 sounds its conventional audible alarm and also sends a signal to cause a remotely located fire extinguisher(s) to sound an audible alarm or verbal location identifier (for example a verbal "Fire Extinguisher") or both. Occupants can as a result, quickly locate the fire extinguisher.

The communication link between the detector and the remotely located fire
10 extinguisher(s) can be wireless (radio frequency, audio frequency or infrared). Alternately, the link can be hardwired. In yet another embodiment, both types of links can be used.

The audible tone/voice emitter electronic circuitry located at the fire extinguisher may be mounted directly to the fire extinguisher or the mounting hardware for the
15 extinguisher. The circuitry may be positioned adjacent to the extinguisher.

As an alternate embodiment, a battery-powered light may be included along with the local alarm or verbal location identifier to facilitate finding the fire extinguisher in the dark. The battery powered light component activates along with the fire
extinguisher alarm locator and/or verbal location identifier.

The wireless communication receiver located on the fire extinguisher or mounting
20 hardware can be battery operated to afford portability or may be 120VAC powered in another embodiment. The detector, a smoke, flame or heat detector can be battery powered or powered by 120VAC. The detector need only have the capability to detect one environmental condition (smoke or fire or excessive heat) within an
25 adjacent region.

Numerous other advantages and features of the present invention will become readily apparent from the following detailed description of the invention and the embodiments thereof, from the claims and from the accompanying drawings.

Brief Description of the Drawings

30 Fig. 1 is an overall view of an extinguisher locator system in accordance with the present invention ; and

Fig. 2 is a more detailed drawing of the extinguisher locator system of Fig. 1.

Detailed Description of the Preferred Embodiment

While this invention is susceptible of embodiment in many different forms, there are shown in the drawing and will be described herein in detail specific embodiments thereof with the understanding that the present disclosure is to be considered as an
5 exemplification of the principles of the invention and is not intended to limit the invention to the specific embodiments illustrated.

As illustrated in Figure 1, a preferred embodiment, a system 10 includes an environmental condition detector (smoke detector, fire detector or heat detector, as separate embodiments) 14 and a fire extinguisher 16. An output unit 18 can be
10 attached to or associated with extinguisher 16.

With respect to Fig. 2, the detector 14 includes a smoke, fire, or heat detection module 20, a wireless transmitter 22, and a power supply 24. Upon detection of smoke, fire, or heat in the immediate area, the detection module 20 sounds its included audible alarm and activates the wireless transmitter 22. A wireless signal (radio
15 frequency, audio frequency or optical) S is transmitted from the detector 14. The detector power supply 24 includes battery(s) and/or 120VAC power as are well known in the art.

The fire extinguisher receiver module 18, receives, decodes, and validates the wireless signal S. Upon validation of a transmitted wireless signal S, the receiver
20 module 18 activates an audible alarm and/or a periodic audible verbal location circuit 30. The circuit 30 includes stored digital phrases, such as "Fire Extinguisher".

When circuit 30 is activated, a stored phrase such as "Fire Extinguisher" is audibly stated such that the location of fire extinguisher unit 16 may be quickly identified. A lamp 32 can optionally be included and illuminated to further assist in the location of
25 the fire extinguisher unit 16, especially in a dark environment.

The wireless signal S is transmitted for the duration of the environmental condition detected by the detector module 20. The fire extinguisher receiver unit 18, and all of its electrical components can be battery operated. This provides flexibility in locating the fire extinguisher unit 18. Alternately, unit 18 may be 120VAC powered with or
30 without battery backup.

Unit 18 can be attached to extinguisher 16. Alternately, unit 18 can be placed on the floor or wall adjacent to extinguisher 16.

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In an alternate embodiment, detector 14 and extinguisher 18 can be hardwired to one another. In yet another embodiment, detector 14 can wirelessly transmit to a plug-in module 40, illustrated in phantom. Module 40 can in turn be coupled to unit 18 using a wired medium, for example the local electrical wiring.

- 5 From the foregoing, it will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the invention. It is to be understood that no limitation with respect to the specific apparatus illustrated herein is intended or should be inferred. It is, of course, intended to cover by the appended claims all such modifications as fall within the scope of the claims.

What Is Claimed:

1. An apparatus to identify the location of a displaced fire extinguisher comprising:
 - detector for detecting the presence of fire in a region, wherein the detector
 - 5 includes electronic circuitry including a wireless transmitter activated to emit a wireless signal for the duration of the condition detected by the detector; and
 - a displaced wireless signal receiver capable of receiving and decoding the wireless signal from the detector wherein the wireless receiver includes circuitry to activate one of an audible alarm or a recorded verbal location identifier at the location
 - 10 of the fire extinguisher to facilitate location thereof.
2. An apparatus as in claim 1 wherein the wireless transmitter outputs one of a radio frequency signal, an acoustic signal and an optical signal.
3. An apparatus as in claim 1 wherein the receiver includes speech synthesizing circuitry.
- 15 4. An apparatus to activate a battery operated light in response to a detected condition comprising:
 - an environmental condition detector which includes a wireless transmitter activated to transmit a selected signal for the duration of the environmental condition
 - detected by said detector;
 - 20 a fire extinguisher, remotely located relative to the detector; and
 - a wireless signal receiver, adjacent to or coupled to the extinguisher and capable of receiving and decoding the selected signal from the detector, wherein the receiver includes an electric light and
 - circuitry to activate light to facilitate location identification of the said fire extinguisher
 - 25 and to provide an emergency flashlight.
5. An apparatus as in claim 4 wherein the receiver is carried in a housing located in the vicinity of the extinguisher.
6. An apparatus as in claim 4 whereby the receiver is attached to the extinguisher.
- 30 7. An apparatus to identify the location of remotely located fire extinguisher comprising:
 - an environmental detector wherein the detector electronic circuitry includes

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a transmitter activated to emit an electrical signal over, at least in part, a hardwired connection between the detector and one or more remotely located fire extinguisher mounting units for the duration of the environmental condition detection by the detector;

5 at least one fire extinguisher mounting unit located remotely relative to the detector and comprising an element to connect to a fire extinguisher;

 and including a hardwired signal receiver capable of receiving and decoding a signal transmitted from the detector, wherein the hardwired signal receiver includes circuitry to activate a recorded verbal identifier at the fire extinguisher to facilitate
10 location of the fire extinguisher.

8. An alarm system comprising:

 a fire detector which includes a housing which carries at least an audible alarm indicating output device and a wireless transmitter of alarm indicating indicia wherein both audible output device and the transmitter are activated in response to a
15 detected fire; and a fire extinguisher which has associated therewith a wireless receiver of the transmitted alarm indicating indicia and an extinguisher location indicating output device whereby in response to received alarm indicating indicia the output device outputs at least one of a visible extinguisher location indicator and an audible extinguisher location indicator.

20 9. A system as in claim 8 wherein the output device comprises at least one of a speech output circuit, a tonal output circuit and a visible light output circuit.

10. A system as in claim 8 wherein the wireless receiver is coupled to an extinguisher connection element.

25 11. An apparatus as in claim 3 wherein the synthesizing circuitry includes a pre-stored extinguisher identifying indicium which is audibly output by the synthesizing circuitry when activated.

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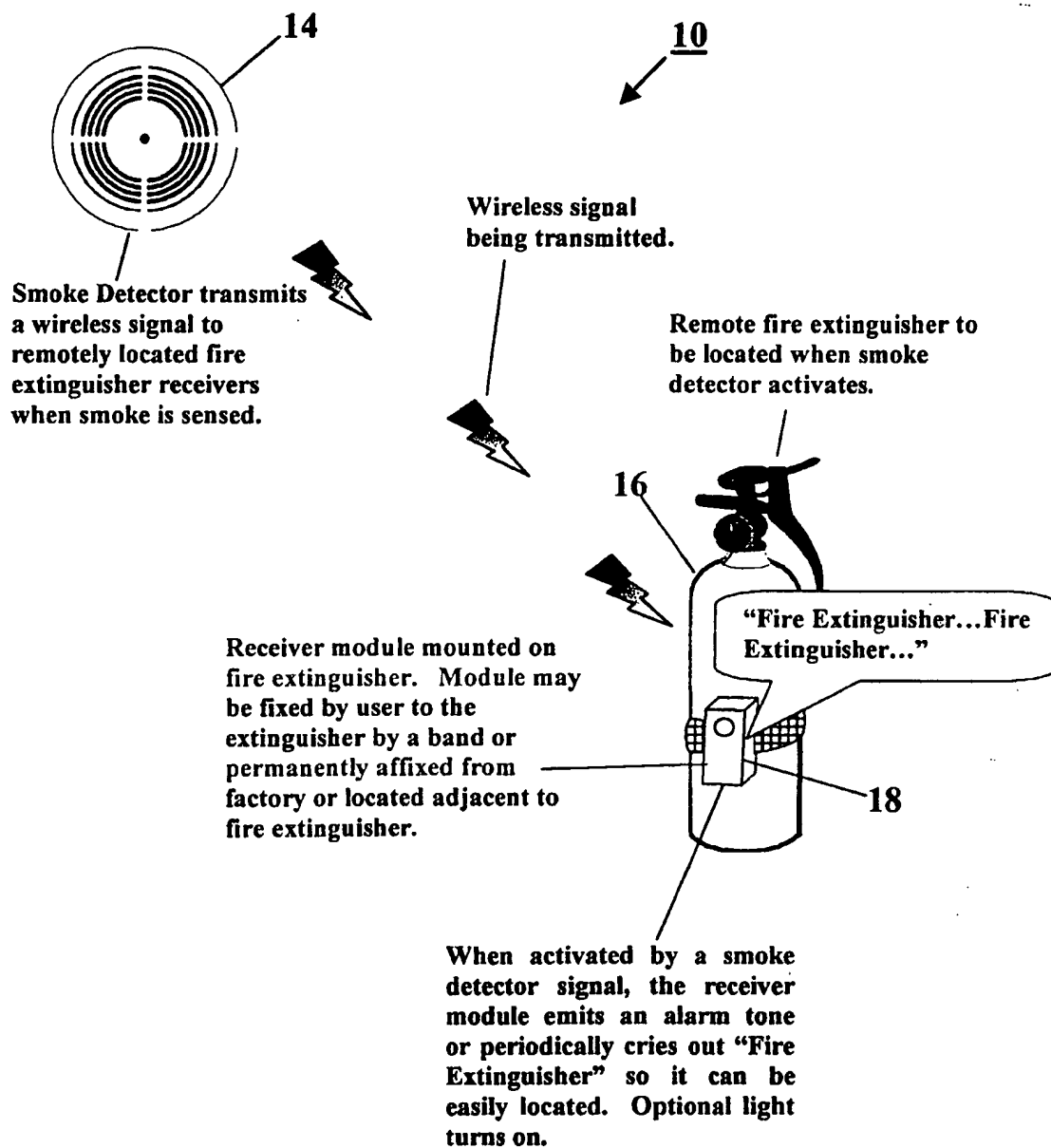
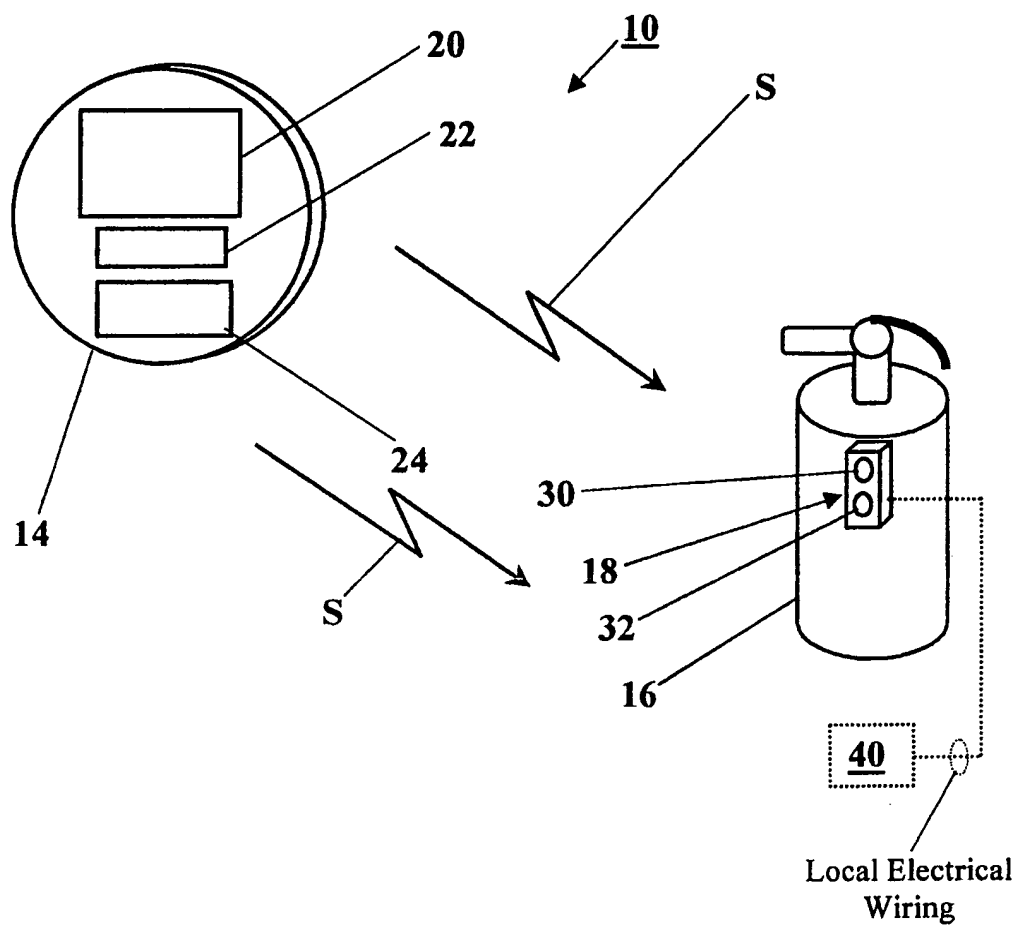


Fig. 1

**Fig. 2**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/01369

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C08B 5/22, 17/10

US CL : 340/628

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 340/539, 568.1, 571, 577, 578, 579, 584, 628, 629, 630, 691.1, 692, 825.36, 825.49

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US 5,153,567 A (CHIMENTO et al.) 06 October 1992, see Abstract and Figs. 1-5.	1-11
A,P	US 5,548,276 A (THOMAS) 20 August 1996, see Abstract and Figs. 3-4.	1-11

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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